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ABSTRACT

During 1993-94 and 1994-95, eight Wake County (North Carolina) Public School Systems schools were funded by the federal Magnet Schools Assistance Program (MSAP) as they attempted to improve students' education and achievement through technology: Poe, Conn, Powell, Bugg, Fuller, and Hunter Elementary; Ligon Middle School, and Enloe High School. This report summarizes the status of the participating schools. Results include: (1) a variety of technology components were implemented in all MSAP schools. Instructional Technology Resource Teachers (ITRTs) conducted many types of training and served as resources to help teachers use technology in their classrooms in all subjects; (2) after the first year of the grant, MSAP elementary schools and Ligon Middle School had made progress towards the two-year goal of reducing the gap between majority and minority performance on end-of-grade (EOG) tests; (3) targeted students at Enloe High School were not more likely than a comparison group to enroll in advanced courses, but were more likely to complete these courses with a grade of C or better; and (4) teachers believe integrating technology with their teaching is important, but many reported that before MSAP, they did not use technology because of time constraints and curriculum coverage requirements. Grant activities appeared to have a positive impact on instruction; teachers' views and use of technology improved by May 1994. Data is summarized in six figures. (Author/MAS)

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Eye on Evaluation

Evaluation and Research Department
Wake County Public School System, Raleigh, NC

E&R Report No. 95E.05
June 1995

IMPROVING ACHIEVEMENT THROUGH TECHNOLOGY:

STATUS REPORT ON THE MAGNET SCHOOLS ASSISTANCE PROGRAM (MSAP)

Authors: Nancy Baenen, Bethany Prohm, Janet Johnson, Jan Donley

Technology is becoming increasingly important in our lives and our educational system. During 1993-94 and 1994-95, the federal Magnet Schools Assistance Program (MSAP) grant funded eight Wake County Public School System (WCPSS) schools as they attempted to improve students' education and achievement through technology: Poe, Conn, Powell, Bugg, Fuller, and Hunter Elementary; Ligon Middle; and Enloe High School. We hope this status report is helpful to all schools as they explore options for the upcoming school year.

RESULTS SUMMARY

The magnet grant schools have successfully integrated technology into their instructional program; some improvements have been evident in achievement patterns.

- A variety of technology components were implemented in all MSAP schools. Instructional Technology Resource Teachers (ITRTs) conducted many types of training and served as resources to help teachers use technology in their classrooms in all subjects.
- After the first year of the grant, MSAP elementary schools and Ligon Middle School had made progress towards the two-year goal of reducing the gap between majority and minority performance on the End-of-Grade (EOG) tests.
- Targeted students at Enloe High School were not more likely than a comparison group to enroll in advanced courses, but were more likely to complete these courses with a grade of C or better.
- Teachers believe integrating technology with their teaching is important, but many reported that before MSAP, they did not use technology because of time constraints and curriculum coverage requirements. Grant activities appeared to have a positive impact for instruction; teachers' views and use of technology improved by May 1994.

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PROGRAM IMPLEMENTATION

ALL SCHOOLS

All participating schools integrated technology through core and elective courses with support from an Instructional Technology Resource Teacher (ITRT). ITRT's believed their role was critical to the successful use of technology for instruction in their schools because they had time to:

- Serve as the facilitator to operationalize how technology could be used successfully for instruction;
- Order, install, and maintain equipment and software;
- Provide training specifically tailored to their school needs, and help teachers move from knowing how software works to utilizing it for instruction; and
- Provide on-campus support for software and hardware.

ITRT's also reported that the principals' ongoing support and encouragement of the staff was critical to the effort, along with teachers' willingness to try new approaches.

In 1993-94, program implementation began with a focus on purchasing and installing equipment and software and training staff to use computers and related technology. Initially, ITRTs in many of the schools also worked to overcome problems with facilities relating to availability of electrical outlets, adequate space with proper lighting, and some security issues. They also spent time explaining the program and gaining support for MSAP from the staff in their schools. By the second semester, ITRTs were helping teachers use technology to develop lessons, providing demonstration classes using model lessons, and helping teachers make better use of computer labs already in their schools. This resulted in an increased number of lessons developed by classroom teachers using technology from the first semester to the second semester. In addition, the focus of teacher technology use shifted from a primary emphasis on teaching more basic skills such as wordprocessing in the first semester, to using more complex technological tools such as CD-ROM and laser discs in the second semester.

In 1994-95, ITRT's trained more teachers and students to use basic technological tools such as wordprocessing, databases, and spreadsheets, and encouraged teachers to become familiar with multimedia and telecommunication technology and integrate this technology into their classroom lessons.

ELEMENTARY SCHOOLS

Several schools offered multimedia elective courses which taught students to use programs such as Hyperstudio to do presentations and projects. For example, Poe staff offered a course entitled "Search and Research Scandinavia," in which students conducted interactive multimedia projects using MacGlobe software and the Internet as sources of information for their projects. Powell offered Lego Logo programming to students in grades 1-5 as elective courses. These elective courses allowed students to actively participate in learning while

exploring and creating using the computer, Logo Writer programming language, and the Lego Dacta Control Lab. The primary objective of the electives was to teach problem-solving skills through collaboration and cooperative learning. ITRTs also trained teachers to use technology (e.g., spreadsheets) for their grading systems and Professional Growth Plans.

LIGON MIDDLE SCHOOL

Additional computers and laser disc players were installed in many classrooms for 1994-95. The ITRT at Ligon trained 360 students to use ClarisWorks, Hyperstudio, and MacGlobe software, enabling these students to complete projects such as reviewing and critiquing books in their language arts classes, and giving multimedia presentations on the Civil War and on tribes in Africa for their social studies classes. A new elective was offered which taught wordprocessing, databases, spreadsheets, and telecommunications technology to students. In addition, teachers received training in technology such as databases, spreadsheets, laser discs, telecommunications, and a variety of educational software packages so they could integrate these tools within their classrooms.

ENLOE HIGH SCHOOL

Teachers at Enloe had technology training in two phases. In phase one, teachers received basic training in technology (Intro to computers, wordprocessing, spreadsheets, databases, telecommunicators/E-mail, and multimedia (Hyperstudio) which was used with CD-Rom, Laserdisc, quicktake camera, video camcorders, and LCD panels.). The second phase included multimedia and curriculum integration into subject areas. Many teachers received training in using technology specific to their subject for instruction (e.g., science probe ware for the science teachers and pre-engineering software for the pre-engineering program). Other training topics included networking, Mac troubleshooting, utility software, software use in instruction, and examples of technology used effectively in classrooms.

Enloe staff continued to focus special efforts on high-achieving minority students in 1994-95. Students were recruited into additional courses in subjects in which they scored above the 80th percentile on End-of-Course tests taken prior to the implementation of MSAP. Teachers in these advanced classes have been encouraged to use the MSAP technology labs as frequently as possible (with all students). The Enloe Instructional Technology Resource Teacher worked with these teachers to design lessons which integrate MSAP technology into the curriculum.

TECHNOLOGY RECOMMENDATIONS

ITRT's used a wide variety of technology tools. Here are ones they cited as making a positive difference to students' achievement.

SOFTWARE

NAME	GRADES	USE
Kid Works 2	K-2	Reading/Writing
Wiggle Works	K-3	Writing
Living Books	K-5	Reading
Jostens Math	K-8	Mathematics
Encarta	2-5	Reference
Compton's	2-5	Reference
ClarisWorks	3-12	Wordprocessing/Graphics
Lego Logo	3-5	Problem Solving
MacGlobe	6-12	Reference/Atlas
MacUSA	9-12	Reference
ABC News Series	9-12	Reference

OTHER

LCD Panel	2-5	Facilitates training on software
A Writing Center	3-5	Writing
Hyperstudio	6-12	Multimedia tool
Laser Disc Players	K-12	Technological tool

TEACHER SURVEY RESULTS

A survey which assessed teachers' attitudes toward and use of technology in the classroom was administered to all teachers in MSAP schools in October 1993 and in May 1994.

Baseline survey results in the fall of 1993 indicated that the majority of teachers at all levels believed technology use would enhance education, but they had little experience using technology. *By spring 1994, the end of the first year of MSAP implementation, teachers reported more favorable attitudes toward instructional technology, and that they had more experience using a variety of technological tools in their classrooms.* For example, word processing use increased substantially at all levels, and CD-ROM and laser disc technology increased at the elementary level.

STUDENT ACHIEVEMENT RESULTS

An important program goal was to reduce the gap in achievement between minority and majority students. Schools tried to accomplish these smaller gaps through improved minority student achievement (not decreased majority achievement). Technology played a major part in changed instructional strategies. The percentage of 1993-94 fourth and sixth graders able to score at Levels III and IV (at grade level or above) on the NC EOG tests was examined to monitor progress (1994-95 results are currently being analyzed)..

LONGITUDINAL COHORT RESULTS

ELEMENTARY

As shown in Figure 1, the percentage of students scoring at or above grade level on the EOG improved for both minority and majority students at three of six elementary schools in reading and five of six schools in mathematics.

Figure 1. Fourth Grade Elementary Cohort Results: Percentage of Students Scoring at Levels III or IV on End-of-Grade

READING TEST

	Bugg		Conn		Fuller		Hunter		Poe		Powell	
Year	Maj.	Min.	Maj.	Min.	Maj.	Min.	Maj.	Min.	Maj.	Min.	Maj.	Min.
1992-93	68%	56%	84%	61%	92%	54%	89%	49%	89%	38%	86%	54%
1993-94	74%	68%	85%	53%	85%	52%	91%	64%	86%	43%	95%	58%
Change	+6%	+12%	+1%	-8%	-7%	-2%	+2%	+15%	-3%	+5%	+9%	+4%

MATHEMATICS TEST

	Bugg		Conn		Fuller		Hunter		Poe		Powell	
Year	Maj.	Min.	Maj.	Min.	Maj.	Min.	Maj.	Min.	Maj.	Min.	Maj.	Min.
1992-93	70%	53%	86%	42%	84%	46%	92%	49%	85%	38%	83%	60%
1993-94	76%	65%	87%	43%	86%	60%	96%	62%	90%	32%	92%	63%
Change	+6%	+12%	+1%	+1%	+2%	+14%	+4%	+13%	+5%	-6%	+9%	+3%

Figure 2 illustrates that *although the gap between minority and majority students was still large following the first year of MSAP, four of six MSAP elementary schools reduced the gap on the EOG reading test, and three of six reduced the gap on the EOG mathematics test.* In all but one case (Fuller in Reading), the progress in closing the gap was attributable to improvements in minority performance (not decreases in majority student performance).

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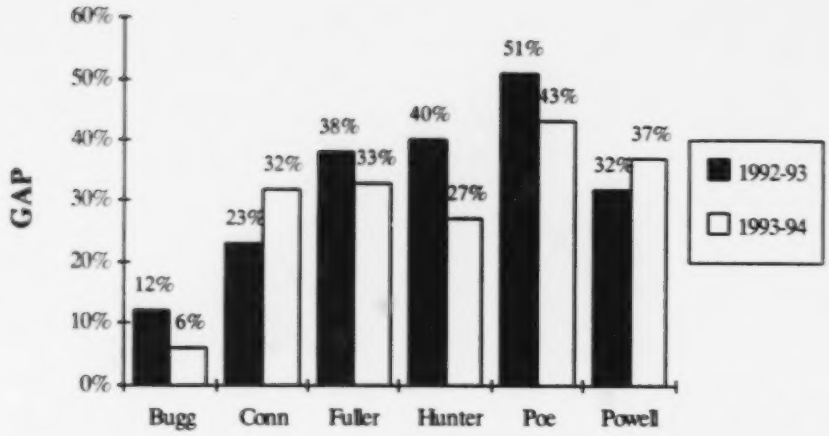
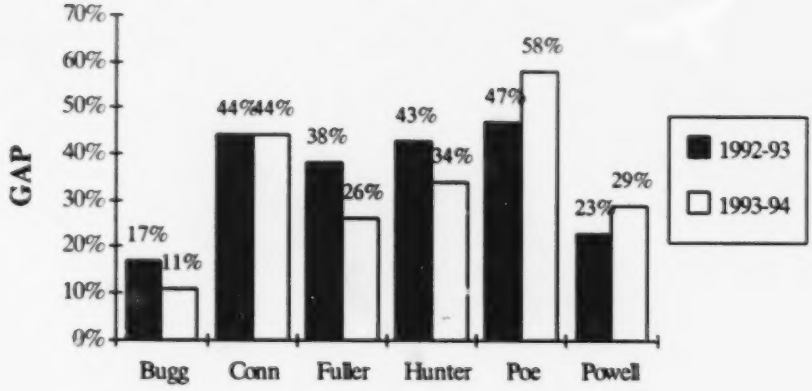
Figure 2.
Fourth Grade Elementary Cohort Results:
Gap between Percentage of Majority and Minority Students Scoring at Levels III or IV on EOG

READING



MATHEMATICS



Note: Gap reflects majority minus minority. Smaller gaps are desirable, as long as overall achievement does not decline.

MIDDLE SCHOOL

As illustrated in Figure 3, a large discrepancy existed between majority and minority student performance both before and after one year of the MSAP program. *The gap did decrease slightly for mathematics from 1992-93 to 1993-94, but not for reading.*

Figure 3. Ligon Cohort Results: Percentage of Students Scoring at Levels III or IV on 1992-93 and 1993-94 EOG Mathematics and Reading Tests

	Reading			Mathematics		
Year	Majority	Minority	Gap	Majority	Minority	Gap
1992-93	87%	44%	43%	83%	45%	38%
1993-94	85%	36%	49%	89%	54%	35%
Change	-2%	-8%	+6%	+6%	+9%	-3%

HIGH SCHOOL

A primary goal of MSAP at Enloe High School was to increase the average number of advanced courses that high-achieving Black students successfully completed, as compared with a similar group of high-achieving Black students from the years prior to MSAP implementation.

Figure 4. Average Advanced Courses Taken and Successfully Completed for the Enloe Target and Comparison Group

	Overall		By Subject Area*			
Group	Courses Completed	Courses Completed with "C" or Better	English Courses	Math Courses	Science Courses	Social Studies Courses
Target (n=108)**	1.78	1.44	0.52	0.27	0.40	0.26
Comparison (n=113)**	1.76	1.30	0.39	0.21	0.38	0.32

*Subject area courses were all completed with a "C" or better.
**Target and comparison group were comprised of high achieving Black students in 10th and 11th grade.

As shown in Figure 4, *on the average, target-group students successfully completed a similar number of advanced courses compared with the comparison-group students (1.78 versus 1.76). Thus, the high achieving minority students at Enloe who have been targeted to receive MSAP services did not enroll in a substantially greater number of advanced courses than a comparison group of similar students.* On the other hand, it should be noted that

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these averages reflect only one school year of data in which students have the opportunity to take one advanced course per subject (for a maximum of four advanced courses).

The target group of 108 students completed a total of 192 advanced courses and passed 81% of them with a C or better (successfully completed); the 113 comparison group students completed a total of 199 advanced courses and passed 73% of them with a C or better. *Thus, a greater percentage of the advanced courses in which target-group students enrolled were completed with a grade of C or better; MSAP services appear to be helping students who do enroll in advanced courses.*

OVERALL SCHOOL RESULTS

To determine whether MSAP resources impacted overall academic outcomes at participating schools, school EOG achievement data in 1992-93 (baseline) and 1993-94 (following year 1 of MSAP) were examined for each grade. Majority students have generally scored considerably higher than minority students. One goal for all MSAP schools was to reduce the existing performance gap between majority and minority students by at least 8% at each grade level.

Figure 5. Difference Between Majority and Minority Students Scoring at Level III or IV on 1992-93 and 1993-94 EOG tests.

School	Year	3rd		4th		5th	
		Reading	Math	Reading	Math	Reading	Math
Bugg	1992-93	10%	23%	11%	18%	16%	16%
	1993-94	21%	37%	6%	11%	-3%*	4%*
Conn	1992-93	32%	45%	34%	42%	39%	43%
	1993-94	22%*	29%*	32%	44%	35%	41%
Fuller	1992-93	39%	43%	25%	31%	38%	53%
	1993-94	36%	40%	33%	26%	24%*	11%*
Hunter	1992-93	46%	47%	49%	44%	51%	46%
	1993-94	47%	43%	27%*	34%*	44%	32%*
Poe	1992-93	35%	37%	35%	36%	31%	27%
	1993-94	35%	44%	43%	58%	25%	31%
Powell	1992-93	33%	35%	34%	34%	32%	28%
	1993-94	14%*	29%	37%	29%	32%	41%
School	**Year**	**6th**		**7th**		**8th**	
		Reading	**Math**	**Reading**	**Math**	**Reading**	**Math**
Ligon	1992-93	29%	36%	34%	36%	33%	39%
	1993-94	39%	25%*	29%	30%	24%*	36%

Note: Highlighted percentages reflect a reduction in the achievement gap between majority and minority students for 1993-94 and a * indicates a reduction of 8% or more.

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When reading and math scores were examined across schools by grade and subject area, the following positive changes were evident (see Figure 5):

- In 28 of 42 comparisons (67%), the achievement gap decreased between majority and minority students. Positive changes were most evident at Conn, Fuller, Hunter, and Ligon (five of six comparisons were positive), followed by Bugg (four of six comparisons were positive), and were least evident at Poe (one of six comparisons were positive).

- The reduction in the achievement gap was large enough to meet or exceed the spring 1995 target decrease of 8% *one year early* in 12 of the 42 comparisons (29%).

- The achievement gap was smallest (11% or less) at Bugg Elementary in grades 4 and 5 (with minority students at grade 5 outscoring majority students by 3%) and at Fuller in math at grade 5.

A second goal, for any schools that were below the overall WCPSS percentages for students at or above proficiency levels III and IV, was to reduce that difference by 8%. As Figure 6 illustrates, progress was made in about half of the comparisons.

- In 16 of 31 comparisons (52%), progress was made towards the WCPSS average achievement and in some cases schools exceeded it. Positive changes were most evident at Hunter (with all five comparisons being positive) followed by Fuller (with three out of five comparisons being positive) and less evident at Bugg (with one of six comparisons being positive).

- Hunter Elementary made the largest improvement towards the WCPSS average for 1993-94, by reducing fourth-grade math achievement by 13% and exceeding the WCPSS average by 6%.

Figure 6. School Progress Towards WCPSS Average Achievement Between 1992-93 and 1993-94

School	3rd		4th		5th	
	Reading	Math	Reading	Math	Reading	Math
Bugg	No	No	Yes(6%)	No	No	No
Conn	No	Yes(2%)	Yes(6%)	Yes(1%)	No	No
Fuller	No	Yes(6%)	NA	No	Yes (3%)	Yes(11%)
Hunter	Yes(12%)	Yes(9%)	Yes(10%)	Yes(13%)	Yes(1%)	NA
Poe	Yes(2%)	Yes(3%)	No	No	No	Yes(2%)
Powell	NA	NA	NA	NA	No	No
School	**6th**		**7th**		**8th**	
	Reading	Math	Reading	Math	Reading	Math
Ligon	NA	NA	NA	NA	NA	Yes(4%)

Note: Schools with NA were already at or above the WCPSS average in 1992-93 and therefore were not appropriate to include in the comparison.

CONCLUSIONS

Preliminary results suggest that a variety of technology components are being implemented in all MSAP schools and that achievement is generally improving. The results at the high school level suggest that targeted students who did enroll in advanced courses benefited from MSAP, although greater efforts are needed to encourage highly able minority students to enroll in advanced level courses. Progress has been slower in changing enrollment patterns. Enrollment patterns could improve with expanded efforts and planned changes in the magnet focus at Bugg and Poe. Expanded efforts to make parents aware of the types of technology being used at the school level could be valuable as well.

A final report on the success of this Magnet Schools Assistance Program over both years will be completed in fall of 1995. For a more detailed report of the results described in *this* summary, contact E&R (850-1903) for the Interim Report No. 95.13.